Courier™ V.Everything™

Command Reference Addendum

Internal and External Modems

Congratulations! You have just purchased a U.S. Robotics Courier V.Everything that is x2-capable. x2 is a groundbreaking new technology that allows your modem to use normal analog phone lines to connect at speeds up to 56 kbps.

Information about x2

For more information about x2, visit the U.S. Robotics x2 Web Site at http://www.usr.com/x2

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Contacting U.S. Robotics

We've made every effort to provide you with useful, accurate information. If you have any comments or questions, please let us know.

To do this	Contact
Contact U.S. Robotics Technical Support	800.550.7800
Visit the x2 web site	http://www.usr.com/x2

Enhanced x2 Features

Your Courier modem with x2 has new result codes and the following new features. Refer to later sections of this Addendum for more information.

To do this	Use this command
Detemine if x2 is enabled in your modem	**ATI7**
Disable or enable x2	**ATS58**
Limit the upper speed limit of an x2 connection	**AT&N**
Limit the lower speed limit of an x2 connection	**AT&U**
Configure the High Speed (HS) LED	**ATS69**

Note: New x2 features should be transparent to most users. If you are an advanced user, see "Controlling x2" and "Controlling Link Speeds with &N and &U" for detailed information regarding these new features.

How to Tell if x2 is Enabled in Your Modem

If you aren't sure whether x2 is enabled in your Courier modem, use the **ATI7** command to display product configuration information. If x2 is enabled on your Courier modem, the following information displays:

```
USRobotics Courier V.Everything Configuration Profile...
Copyright, 19xx-96, U.S. Robotics. All rights reserved.

Product type            US/Canada External
Options                 HST,V32bis,Terbo,VFC,V34+,x2
Fax Options             Class 1,Class 2.0
Clock Freq              20.16Mhz
Eprom                   256k
Ram                     32k

Supervisor date         02/01/97
DSP date                02/01/97

Supervisor rev          7.0.0
DSP rev                 2.0.0

Serial Number           {serial number}

OK
```

Note: Dates, serial numbers, and revision numbers may vary. The most important line is the "Options" line, which lists support for x2.

How x2 Works

U.S. Robotics' x2 technology enables analog modems to receive data at up to 56 kbps over the standard analog, public switched telephone network (PSTN). x2 overcomes the limitations imposed on standard, analog modems by exploiting the digital connections that most Internet and online service providers have at their end to connect to the PSTN.

The Shift from Analog to Digital Circuits

When the first telephone networks were established, they were completely analog. Over time, telephone companies began replacing portions of their analog networks with digital circuits, which provided a higher telephone signal quality at a more economical price.

Today, the PSTN is almost entirely digital. Typically, the only portion of the telephone network that remains analog is the line that connects your home to the telephone company's central office (CO). The rest of the telephone network is digital.

Client and Server Modems

x2 will not require changes to your wiring and equipment that's already in place. All that's required to use x2 is a software upgrade.

Client Modems

x2 client modems can receive data at speeds up to 56 kbps and send data at V.34 speeds. The following products are examples of U.S. Robotics Client modems:

- Courier™ V.Everything™ with x2
- Sportster® with x2
- Analog Modem Pools or NETServer with x2

Server Modems

The digital x2 modems that client x2 modems connect to are called server x2 modems. Server modems can send data to client x2 modems at speeds up to 56 kbps. A server must have a "digital" interface to the PSTN. This digital interface can be in the form of a "trunk-side" T1, Primary Rate Interface (PRI) , or Basic Rate Interface (BRI). The following products are examples of client x2 modems:

- Courier I-modem with x2 (in Server Mode)
- Quad Modem 5.0/5.1 (in Server Mode)
- MP I-modem or NETServer I-modem with x2

Making x2 Work

To use x2, the client x2 modem must connect to a server x2 modem. If clients attempt to connect to ISPs that do not use x2, the client modem will negotiate the next available modulation. For example, an x2 client modem calling into an ISP that only supports V.34, the modem will only negotiate the highest v.34 connection rate. The maximum V.34 connection speed is 33.6 kbps.

When a client x2 modem connects to a server x2 modem, the path through the telephone network between the modems is subject to the following conditions for an x2 connection to be made.

A Digital Connection At One End

ISPs or online services must have a digital connection to the PSTN. Most major online services have digital connections to the PSTN.

Only One Digital-to-Analog Conversion

There can be only one digital-to-analog conversion in the telephone network between the x2 server modem and the x2 client modem.

Controlling x2

Use the following S58 settings to control x2:

To do this	Use this command
Disable x2	S58.0=1
Force A-law mode	S58.2=1

Table 1 - S58 Settings

Note: A-law is required in all countries but the United States, Canada, Japan, Taiwan, and Hong Kong. If you are using your Courier in one of these countries, do not force A-law mode.

Controlling Link Speeds with &N and &U

You can use the &N and &U commands to control link speeds. Couriers without x2 can still use the &N and &U commands, but can only control link speeds up to 33.6 kbps.

Controlling Link Speeds

You can use the &N and &U commands to control the link speeds of your Courier modem with x2. Use the following table to determine how to use &N and &U commands:

To limit the	Use
Highest possible connect speed	&N
Lowest possible connect speed	&U
Range of possible connect speeds	&N and &U

Table 2 - Using Link Speeds

Note: The default values for &N and &U are 0. If you change these values, you will limit the speeds at which you can connect. U.S. Robotics recommends that you do not alter these values.

Limiting the Highest Possible Connect Speed

The &N command allows you to limit the highest possible connect speed. If a remote modem connects to your Courier modem with x2 at a speed higher than &N, your Courier modem with x2 will not allow it to connect.

To limit the	Use this command
Highest possible connect speed to 33600	**&N=16**

Limiting the Lowest Possible Connect Speed

The &U command allows you to limit the lowest possible connect speed. If a remote modem connects to your Courier modem with x2 at a speed lower than &U, your Courier modem with x2 will not allow it to connect.

To limit the	Use this command
Lowest possible connect speed to 48000	**&U=24**

Limiting a Range of Possible Connect Speeds

By setting &N and &U values, you can limit the range of speeds at which your Courier modem with x2 connects. If a remote modem does not connect to your Courier modem with x2 at a range between the speeds designated by the &N and &U commands, your Courier modem with x2 will not allow it to connect.

Note: The link speed associated with the &U argument cannot be greater than the link speed associated with &N argument.

Use the following table to understand the relationship between &U and &N commands:

If &U	And &N	Then your modem
Equals zero	Equals zero	Connects at the highest possible speed.
	Is greater than zero	Connects at the &N speed only.
Is greater than zero	Is greater than zero and greater than &U	Connects at the highest possible speed in the range from &U to &N.

Table 3 - Constraints on Link Speed

&N and &U Command Values

Use the following table for a complete list of &N and &U link speeds and their associated indexes:

Link Speed	Index
Highest	0
300	1
1200	2
2400	3
4800	4
7200	5
9600	6
12000	7
14400	8
16800	9
19200	10

Link Speed	Index
21600	11
24000	12
26400	13
28800	14
31200	15
33600	16
33333	17
37333	18
41333	19
42666	20
44000	21

Link Speed	Index
45333	22
46666	23
48000	24
49333	25
50666	26
52000	27
53333	28
54666	29
56000	30
57333	31
64000	32

Table 4 - Link Speeds and Indexes

Note: For x2-mode links, &N and &U are used to constrain the speed of the higher speed direction of the link.

Configuring the High Speed (HS) LED

You can configure your Courier to alert you when it reaches x2 speeds. Use the following S69 setting to configure the HS (High Speed) LED:

To do this	Use this command
Configure the HS (High Speed) LED to turn red when your modem reaches speeds over 33.3 kbps.	**S69=12**

Troubleshooting x2 Client Connections

Use the chart below to understand issues affecting your Courier modem and how to fix them:

<table>
<tr><th>Step</th><th>This may be the issue</th><th colspan="2">Do this</th></tr>
<tr><td>1</td><td>x2 may not be enabled on your Courier.</td><td colspan="2">See the section "How to Tell if x2 is Enabled" (Use the ATI7 command)</td></tr>
<tr><td rowspan="4">2</td><td rowspan="4">Several conditions may exist.</td><td colspan="2">Use the ATI11 command and check the "x2 status" field for more information.</td></tr>
<tr><td>If this message appears</td><td>You cannot use x2 because</td></tr>
<tr><td>"Multiple CODECS in channel"</td><td>There are multiple analog-to-digital conversions on the channel.</td></tr>
<tr><td>"Remote modem is not x2"</td><td>The remote modem does not support x2.</td></tr>
<tr><td></td><td></td><td>"Channel is x2-capable but feature is not installed"</td><td>You have not purchased x2.</td></tr>
<tr><td>3</td><td>Your Courier may be connected to the public network via a PBX or other telephone equipment with analog-to-digital and digital-to-analog conversions.</td><td colspan="2">Contact your telephone equipment vendor for information about obtaining pure analog service.

Due to extra analog-to-digital conversions performed by some PBX's and other telephone equipment, x2 client modems may not be able to make x2 connections.</td></tr>
<tr><td>4</td><td>There is another issue.</td><td colspan="2">Do the following:

• Visit the U.S. Robotics x2 Web Site at http://www.usr.com/x2

• Contact U.S. Robotics Technical Support at 800.550.7800</td></tr>
</table>

Plug and Play (Internal Couriers Only)

The internal Courier V.Everything modem is now shipped Plug and Play-ready. When you install the modem in a computer that uses a Plug and Play-compliant operating system (Windows ® 95), the computer automatically detects and configures itself to support the Courier.

Disregard the Following Documentation

Since the Courier is now preconfigured for Plug and Play, disregard the following portions of the Courier documentation:

The following sections in the *Courier V.Everything Internal Modem: Getting Started*:

— "Plug and Play Setup" on page 2-4

— "Installing the .INF File" on page 3-2

All references to Plug and Play and jumpers in the following documentation:

— *Courier V.Everything Command Reference*

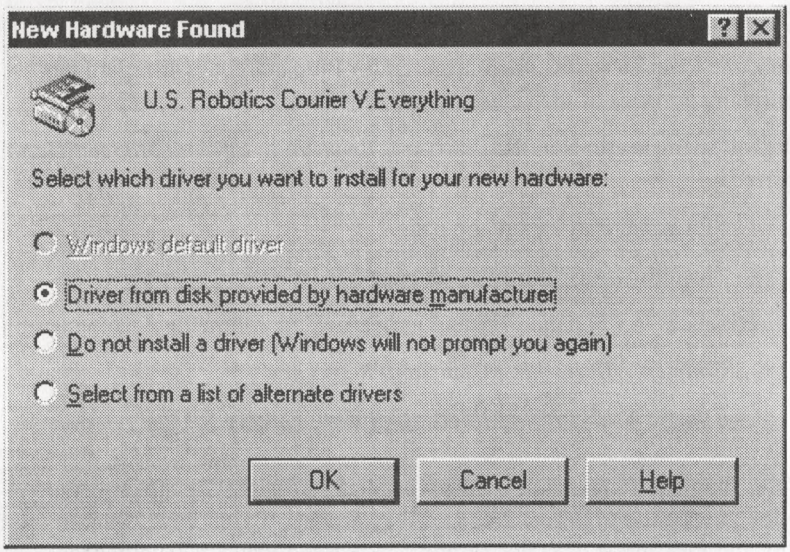
— *Courier V.Everything Internal Modem: Getting Started*

Note: Plug and Play makes modem installation easier. Use the procedure in the following section to install Plug and Play drivers. If you do not want to use the Plug and Play mode of your operating system, you must manually change the switches on the modem (called jumpers) to the desired COM port/ IRQ settings. Instructions for changing the jumpers are on pages 2-5 to 2-7 of the *Courier V.Everything Internal Modem: Getting Started* manual.

Installing the Drivers (Internal Couriers Only)

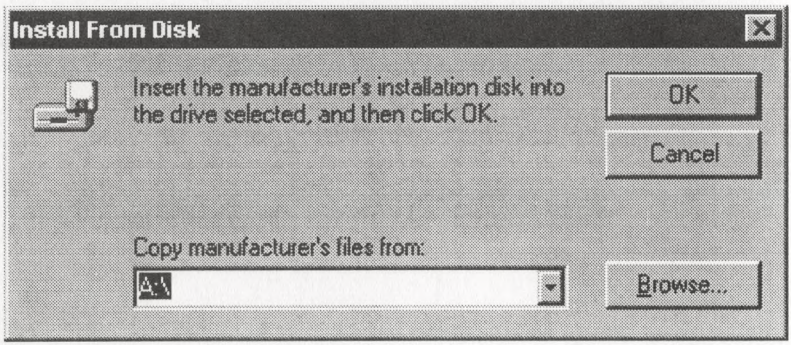
Follow the steps below to install internal Courier modem Plug and Play drivers for Windows 95:

1 Power on your computer and start Windows. Your computer detects new hardware and displays the following window:

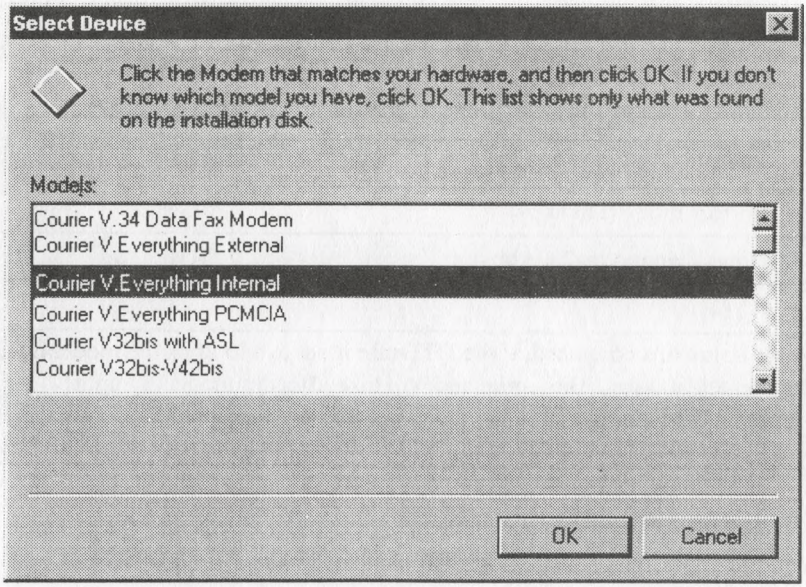

New Hardware Found
U.S. Robotics Courier V.Everything
Select which driver you want to install for your new hardware:
Windows default driver
Driver from disk provided by hardware manufacturer
Do not install a driver (Windows will not prompt you again)
Select from a list of alternate drivers
OK
Cancel
Help

2 Select **Driver from disk provided by hardware manufacturer** and click **OK** to install the Plug and Play driver that is provided on the Quick Link disk.

3 When the following window appears, insert your Quick Link disk into a:\ (or b:\) and click **OK** to install the Plug and Play driver.



Windows 95 displays the following window asking you to choose your Courier modem type from the list:


Select Device
Click the Modem that matches your hardware, and then click OK. If you don't know which model you have, click OK. This list shows only what was found on the installation disk.
Models:
Courier V.34 Data Fax Modem
Courier V.Everything External
Courier V.Everything Internal
Courier V.Everything PCMCIA
Courier V32bis with ASL
Courier V32bis-V42bis
OK
Cancel

4 Select the **Courier V.Everything Internal** modem from the list and click **OK**.

Plug and Play installation is complete!

Other Issues (Internal Couriers Only)

Setting DTE Rate to 230 kbps

The DTE rate of your Courier has been increased to 230 kbps to enhance throughput. Use the following table to control the 230 kbps DTE rate:

To set the modem to operate	Use this command
At Normal mode (115 kbps)	%G0
At Times Two mode (230 kbps)	%G1

Note: Using this command, if the DTE rate is set to 115 kbps the modem will respond at 230 kbps. This command will take affect immediately upon execution. The next AT command will operate at 230 kbps. This command is only supported on internal Courier V.Everything modems with Plug and Play.

UL Listed Accessory

Your internal Courier modem is a UL listed accessory. It must be used with a UL listed computer

New x2 Result Codes

Use the following table for a list of all result codes, including new x2 result codes:

Numeric	Alphanumeric
180	CONNECT 33333
181	CONNECT 33333/ARQ
182	CONNECT 33333/x2
183	CONNECT 33333/ARQ/x2
184	CONNECT 37333
185	CONNECT 37333/ARQ
186	CONNECT 37333/x2
187	CONNECT 37333/ARQ/x2
188	CONNECT 41333
189	CONNECT 41333/ARQ
190	CONNECT 41333/x2
191	CONNECT 41333/ARQ/x2
192	CONNECT 42666
193	CONNECT 42666/ARQ
194	CONNECT 42666/x2
195	CONNECT 42666/ARQ/x2
196	CONNECT 44000
197	CONNECT 44000/ARQ
198	CONNECT 44000/x2
199	CONNECT 44000/ARQ/x2
200	CONNECT 45333
201	CONNECT 45333/ARQ
202	CONNECT 45333/x2
203	CONNECT 45333/ARQ/x2
204	CONNECT 46666
205	CONNECT 46666/ARQ

New x2 Result Codes (Continued)

Numeric	Alphanumeric
206	CONNECT 46666/x2
207	CONNECT 46666/ARQ/x2
208	CONNECT 48000
209	CONNECT 48000/ARQ
210	CONNECT 48000/x2
211	CONNECT 48000/ARQ/x2
212	CONNECT 49333
213	CONNECT 49333/ARQ
214	CONNECT 49333/x2
215	CONNECT 49333/ARQ/x2
216	CONNECT 50666
217	CONNECT 50666/ARQ
218	CONNECT 50666/x2
219	CONNECT 50666/ARQ/x2
220	CONNECT 52000
221	CONNECT 52000/ARQ
222	CONNECT 52000/x2
223	CONNECT 52000/ARQ/x2
224	CONNECT 53333
225	CONNECT 53333/ARQ
226	CONNECT 53333/x2
227	CONNECT 53333/ARQ/x2
228	CONNECT 54666
229	CONNECT 54666/ARQ
230	CONNECT 54666/x2
231	CONNECT 54666/ARQ/x2
232	CONNECT 56000

New x2 Result Codes (Continued)

Numeric	Alphanumeric
233	CONNECT 56000/ARQ
234	CONNECT 56000/x2
235	CONNECT 56000/ARQ/x2
236	CONNECT 57333
237	CONNECT 57333/ARQ
238	CONNECT 57333/x2
239	CONNECT 57333/ARQ/x2
240	CONNECT 64000
241	CONNECT 64000/ARQ
242	CONNECT 64000/x2
243	CONNECT 64000/ARQ/x2

Table 5 - New Result Codes

There is a complete list of result codes in your Courier *Command Reference*.